Goddard Space Flight Center 2009 Sample Student Projects

Required Academic Level

Junior/Senior Undergraduate, Graduate/Masters

Category

Earth Sci

Subcategory

Biospheric Science

Project Title

Satellite & Model Comparisons of Aerosol Optical Depth/Carbon Monoxice (AOD/CO) Ratio in Source & Downwind Regions of Boreal Biomass Burning

Project Description

The Aqua satellite, as a part of NASA A-Train satellite constellation, measures a variety of trace gases and aerosols. MODIS AOD (Aerosol Optical Depth) and AIRS CO (Carbon Monoxide) products were used in daily flight planning during ARCTAS spring and summer field deployments. Satellite products reflect to the realtime measurements with significant cloud coverage while GEOS-5 model outputs are continuous in space and time, which are the best tool to track the transport of smoke plumes. Previous analyses showed significant correlation (e 0.8) between MODIS AOD and MOPITT CO at global scale with coarser spatial resolutions. This study focuses on the summertime (June-August 2008) when boreal biomass burning is most intensive. The purpose is to better estimate emission ratio of aerosol number density to CO concentration for model simulations. The domains of the study include Eurasia and North America. Specifically, this study will incorpoate (1) high-resolution (5-km and 2-km) MOIDS AOD retrievals, in addition to 10-km standard products, to enhance the correlation with AERONET sunphotometer measurements, (2) AIRS total CO columnar abundance and 500-mb CO to compare with GEOS-5 CO simulations, (3) coincident CALIPSO smoke vertical distribution to pinpoint locations of smoke plumes, (4) analyses of AOD/CO ratios in various source regions, and (5) analyses of AOD/CO ratios between source and downwind.

Mentor's Expectation of Student

The scientific findings are expected to be presented in AGU Fall Meeting and professional journal publication.

Discipline of Project and/or Background Needed to successfuly complete the project

Earth Science

Skills

Analysis, Linux/Unix, Windows